

Research Article

Research on the Evolution of High-Quality Development of China's Provincial Foreign Trade

Yanqiu Wu^{1,2} and Shuxiao Zhang ¹

¹Business School of Northeast Normal University, Changchun, Jilin 130117, China

²School of Economics and Management of Northeast Electric Power University, Jilin 132000, China

Correspondence should be addressed to Shuxiao Zhang; zhangsx562@nenu.edu.cn

Received 4 December 2021; Revised 26 December 2021; Accepted 28 December 2021; Published 25 January 2022

Academic Editor: Tongguang Ni

Copyright © 2022 Yanqiu Wu and Shuxiao Zhang. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The new development concept is the theoretical guidance and important foundation for high-quality foreign trade development in the new era. This paper develops an evaluation index system to measure the high-quality development level of foreign trade based on the meaning of high-quality development of foreign trade under the new concept of development. The dynamic changing trend of high-quality development of China's provincial foreign trade from 2013 to 2019 and the ranking change of the development index are examined in this paper using a time series factor model. Finally, China's provinces are categorized based on the quality of their foreign trade development. The findings show that, from 2013 to 2019, China's high-quality foreign trade development has been on the rise; the level of high-quality foreign trade development has been raised to varying degrees in the eastern, central, and western regions of China, but each region plays a different role. Compared to 2013, the truly "high-quality" areas of China's provincial foreign trade development were always concentrated in the eastern region, which ranked high on the comprehensive evaluation index, while the "low-quality" areas were mainly concentrated in the central and western regions, which ranked low on the comprehensive evaluation index.

1. Introduction

China has made remarkable achievements in foreign trade over the course of more than 40 years of reform and opening-up and has risen to become the world's first trade power. China's foreign trade has successfully completed the "Quantity" leap while also greatly improving in "Quality," with the trade structure continuing to improve and trade competitiveness improving. However, China's foreign trade development is beset by difficulties. The new crown epidemic, in particular, continues to spread around the globe, and the external environment is becoming more uncertain and risky. The global economy remains sluggish in the face of profound changes unseen in centuries, making China's foreign trade situation more complex and severe, with numerous flaws. The promotion of high-quality foreign trade development has become a central issue in China's trade development. The 19th CPC National Congress

pointed out that China's economy will develop from high speed to high quality. It requires that China's trade development change from high-growth to high-quality stage. In 2019, the CPC Central Committee and the State Council issued "the Guiding Opinions on Promoting High-quality Development of Trade," which further points out the direction for China's high-quality development of foreign trade in the new era and at the same time puts forward new requirements. Therefore, to scientifically build an evaluation system for the high-quality development of China's foreign trade, to measure the high-quality development of China's foreign trade in the new era, and to find out the sources of power and sources of resistance, it is of far-reaching practical significance to promote the high-quality development level of China's foreign trade.

So, has China's foreign trade's high-quality development level improved? What about China's provincial foreign trade's high-quality development level? What distinctions,

trends, and gaps exist between regions? As a result, the paper develops a high-quality development index system for China's provincial foreign trade and employs the global factor model of time series to measure and analyze the high-quality development level of China's provincial foreign trade. This paper examines the advantages and disadvantages, as well as the potentials and barriers, to the development of foreign trade in each province in order to provide a reliable endogenous power source for the high-quality development of China's foreign trade.

At present, scholars' research on the high-quality development of foreign trade mainly focuses on the following aspects:

- (1) The meaning of high quality in foreign trade. For example, Xiang and Song believe that "Imbalance" and "Inadequate" represent the new era of China's high-quality foreign trade development and from these two aspects give a specific definition [1]; Chen believes that the high-quality development of foreign trade represents the high-level economic and trade cooperation of "You have me, I have you" and can fully highlight the essential goal and development orientation of Integration [2]; Gao believes that an accurate understanding of the meaning of high-quality trade should not only reflect the inherent requirements of building a strong trading nation but also reflect the trend of the times that trade development conforms to the changes in China's social contradictions [3]; Ma believes that high-quality development of foreign trade should include five fundamentals: an optimized development structure, a more balanced development pattern, a sustained development momentum, a more open development model, and a more inclusive development concept [4].
- (2) The research on the measurement and evaluation of the high-quality development of foreign trade. Due to the high-quality development of foreign trade proposed in a relatively short time, the literature in this area are less.

For example, Qu et al. established the index system of high-quality development of foreign trade from the basis of trade, trade optimization, trade competitiveness status, trade comprehensive services, and international economic and trade rules status of five dimensions, which includes 34 indicators, but they did not use the index system to measure the high-quality development of foreign trade [5]; Tang and Xia set up a high-quality development evaluation index system from the perspective of trade in services, which includes five dimensions (openness and security, structural coordination, sustainable development, innovation drive, and international competitiveness) and 27 indicators, and they also used AHP method to carry out the related analysis [6]; Wu and Zhang selected 26 indicators from five aspects, namely, innovative trade, coordinated trade, green

trade, open trade, and shared trade, to construct an indicator system which was based on the new concept of development, and then they used the entropy method to measure the high-quality development of China's foreign trade from 2001 to 2018 [7]; Cao and Lei also selected 17 indicators based on the new concept of development, from six dimensions of effective, innovative, coordinated, sustainable, open, and shared development, using entropy weight method to measure the high-quality development of China's foreign trade from 2006 to 2018 [8].

- (3) The ways and countermeasures of high-quality development of foreign trade. Some scholars, such as Yang, Chang, and Li, hold that innovative development is the foundation to promote the high-quality development of foreign trade and to strengthen the trade power [9–11]; scholars such as Rong and Xiang hold that the initiative to expand imports is a mechanism to promote high-quality development and its realization path [12, 13]; however, Scholars such as Zhao, Sheng, Pei, and Liu believe that the "fine brushwork" of creating a "Belt and Road" together can continuously open up the market and reduce the degree of dependence on the European and American markets, which is the only way to the high-quality development of foreign trade [14–16].

By examining the existing literature, we can see that, in recent years, an increasing number of scholars have begun to pay attention to China's high-quality foreign trade development, and the scope of the study has gradually expanded from the definition of high-quality foreign trade development to the establishment and measurement of the indicator system. However, because different scholars have different interpretations of what constitutes high-quality foreign trade development, different measurement indexes are chosen, and different measurement results are obtained. Meanwhile, there is little literature on China's high-quality provincial foreign trade. As a result, this paper's marginal contribution consists of the two following points: (1) In terms of the study's content, scholars are currently focusing on the connotation, current situation, and path countermeasures of high-quality foreign trade development, primarily focusing on qualitative analysis; however, measuring the high-quality development level of China's provincial foreign trade is uncommon. As a result, this paper chooses a scientific and rigorous method to measure the high-quality development level of China's provincial foreign trade under the new concept of development, and the research is more in depth. (2) On the research method, this paper uses the time series global factor analysis method to quantitatively analyze the high-quality development of China's provincial foreign trade and space-time dynamic differences, in order to avoid high correlation of variables and subjective randomness in selecting weights.

2. Establishment of an Indicator System for High-Quality Development of China's Provincial Foreign Trade

In order to investigate the changes in time and space of the high-quality development of China's foreign trade, this paper constructs the evaluation index system of high-quality development of China's provincial foreign trade, which is based on the connotation of the high-quality development of China's foreign trade under the new development theory.

2.1. The Construction of an Evaluation Index System. In the new era, the new development concept is the theoretical guidance for the high-quality development of China's foreign trade. Based on this, the paper describes the evaluation index system of high-quality development of China's provincial foreign trade from five aspects: the innovative development of trade, the coordinated development of trade, the green development of trade, the open development of trade, and the development of trade sharing. On the basis of the index system of high-quality development of China trade constructed by Wu and Zhang [7], this paper makes some additions, revisions, and deletions to the index system, as shown in Table 1.

2.2. Data Sources and Indicators Description. The variables of the indicator system in this paper are partly consulted by reference to the established practices and also partly by the following references: using the method of Xu and Lu, the technical complexity of China's provincial high tech exports is calculated in two steps [17]; drawing on research ideas such as those of John et al., from four aspects of transportation infrastructure, port clearance efficiency, system environment, and E-commerce, eight indicators are selected to measure the level of trade facilitation in China and its provinces [18]. Among them, adopting Shi's approach, transport infrastructure facilitation is measured in terms of road density (i.e., the number of miles per 100 square kilometres) and rail network density (i.e., the number of miles per 100 square kilometres) [19]. Using the methods of Yin and others, the customs clearance efficiency of the port is measured by selecting the efficiency of cargo clearance and the efficiency of personnel clearance [20]; using the methods of Chen and Li and Yao and Yan, China's institutional environment is measured by anticorruption efforts and the level of intellectual property protection [21, 22]. The basic data in this paper are from the Statistical Yearbook published by the provinces and regions, "National Economic and Social Development of a Statistical Bulletin," "China Statistical Yearbook on Science and Technology," "China Statistics Yearbook on Environment," "China's Ports-of-Entry Yearbook," the Provincial General Administration of Customs website, provincial statistics department website, and government website. Among them, Tibet is rejected because of too much missing data.

3. The Measurement of the High-Quality Development Level of China's Provincial Foreign Trade Based on the Time Series Global Factor Analysis

- (1) Construction of global factor model of time series.

The time series global data sheet assumes that there are n regions as samples for high-quality development of foreign trade, and each sample has m index variables, thus forming a matrix of $n * m$ order with a time span of t years; a global data table A ($n * m * T$) is constructed:

$$A = \{X_t, \quad t = 1, 2, \dots, T\}. \quad (1)$$

- (2) Dimensionless treatment of evaluation index and calculation of correlation coefficient matrix.
- (3) Computing covariance matrix.

Define the center of gravity of the global datasheet as follows:

$$\begin{aligned} Z &= (X_1, X_2, \dots, X_m) \\ &= \sum_{t=1}^T \sum_{i=1}^n P_i^t Q_i^t. \end{aligned} \quad (2)$$

P_i^t represents the weight of individual Q_i of the sample in year t and satisfies

$$\sum_{t=1}^T \sum_{i=1}^n P_i^t = 1, \quad \sum_{i=1}^n P_i^t = \frac{1}{T}. \quad (3)$$

Suppose that the overall variables for the measurement of the high-quality development of China's provincial foreign trade are X_j .

$$X_j = (X_{1j}^1, X_{2j}^1, \dots, X_{nj}^1; X_{1j}^2, X_{2j}^2, \dots, X_{nj}^2; X_{1j}^T, X_{2j}^T, \dots, X_{nj}^T).$$

Then the global variance function is $E_j^2 = \text{var}(X_j) = \sum_{t=1}^T \sum_{i=1}^n P_i^t (X_{X_j}^t - \bar{X}_j)^2$.

The corresponding global covariance function is

$$\begin{aligned} E_{jk} &= \text{cov}(X_j, X_k) \\ &= \sum_{t=1}^T \sum_{i=1}^n P_i^t (X_{X_j}^t - \bar{X}_j)(X_{X_k}^t - \bar{X}_k). \end{aligned} \quad (4)$$

Thus, the global covariance matrix can be expressed as $V = \sum_{t=1}^T \sum_{i=1}^n P_i^t (Q_i^t - Z)(Q_i^t - Z)'$.

- (4) Find the eigenvector of the covariance matrix
- (5) Calculate common factors

When the global factor method is used to analyze the time series, the main steps to determine the weight of the index variables are as follows.

Step 1. It is to find the expression of the global common factor as follows:

TABLE 1: Evaluation index system of high-quality development of China's provincial foreign trade.

Criterion	Indicator	Variable
Innovative development of trade	Innovation investment	Input intensity of R&D (+)
		Input intensity of education (+)
	Innovation output	Quantity of R&D personnel (+)
		TC index of trade in goods (+)
		TC index of trade in services (+)
Coordinated development of trade	Structure of trade mode	Processing trade's value-added rate (+)
		Export technical complexity of high-tech industry (+)
	Structure of trade entity	Export share of general trade (+)
		Import share of general trade (+)
		Proportion of foreign-capital enterprises in trade (+)
Green development of trade	Environmental effect	Proportion of private enterprises in trade (+)
		Emission intensity of export industrial waste gas (-)
		Emission intensity of export industrial waste water (-)
	Resource utilization	Emission intensity of export industrial solid waste (-)
		Resource consumption per unit export value (-)
Open development of trade	Dependence on foreign trade	Proportion of imports of resource products (+)
	Market structure of foreign country	Total volume of trade/GDP (+)
		Export market evenness (+)
		Import market evenness (+)
		Export market dispersion (+)
	Trade facilitation	Import market dispersion (+)
		Transport infrastructure (+)
Port clearance efficiency (+)		
Sharing development of trade	Per capita foreign trade volume	Institutional environment (+)
		E-commerce (+)
	Contribution of trade to the economy	Total volume of trade/total population (+)
	Contribution of trade to employment	Net export growth/net GDP growth (+)
		Total employment × total volume of export/GDP (+)

$$G_1 = U_{11}X_1 + U_{21}X_2 + \dots + U_{n1}X_n, \quad (5)$$

$$G_m = U_{1m}X_1 + U_{2m}X_2 + \dots + U_{nm}X_n.$$

Among them, G_m is the global common factor m , X_n is the observation variable n , and U_{nm} is the score coefficient of the observation variable n in the global common factor m . After dimension reduction by factor analysis, it should be l $m < n$ in general.

Step 2. It is to construct the expression of comprehensive evaluation score and calculate the index weight.

$$ZG = \frac{(\theta_1 * G_1 + \theta_2 * G_2 + \dots + \theta_m * G_m)}{(\theta_1 + \theta_2 + \dots + \theta_m)} \quad (6)$$

$$= \pi_{1*}X_1 + \pi_{2*}X_2 + \dots + \pi_{n*}X_n.$$

In the above equation, ZG is the comprehensive evaluation score of high-quality development of foreign trade and θ_m is the contribution rate of variance of the global common factor m ; $\pi_n = (\theta_1 * U_{n1} + \theta_2 * U_{n2} + \dots + \theta_m * U_{nm}) / (\theta_1 + \theta_2 + \dots + \theta_m)$.

Calculate the weight of indicator X_i : $V_i = |\pi_i| / (|\pi_1| + |\pi_2| + \dots + |\pi_n|)$.

(1) Steps for measuring the high-quality development level of China's provincial foreign trade.

(i) The standardization treatment of single index

Because each index in the original data has a different order of magnitude, the index must first be standardized. Set 2013 as the base year and apply the following rules to the positive and negative indicators:

Positive indicators: $\text{Singl Index}J = W_j - W_{\min} / W_{\max} - W_{\min} \times 100$

Negative indicators: $\text{Singl Index}J = W_{\max} - W_j / W_{\max} - W_{\min} \times 100$

Among them, W_j is the original data of index j in the base period of a certain region; W_{\max} and W_{\min} are the largest and the smallest of the original values of index j in the base period of 30 provinces, respectively. For other years in each region, a single index is formed relative to the base period.

(ii) Checking the prerequisites

This paper used SPSS 23 software to perform the KMO and Bartlett sphericity tests. The value of KMO in Table 2 is 0.804, which is between 0.8 and 0.9, indicating that the index variable is easy to reduce dimension and is well suited to factor

TABLE 2: KMO and Bartlett's test.

KMO test	0.874
	df 378
Bartlett's test of sphericity	Approx. chi-square 5754.949
	Sig. 0.000

analysis. The Bartlett sphericity test has a significance of 0.000, which is less than 0.01 and is appropriate for factor analysis.

- (3) The index weight is determined, and the comprehensive score of high-quality development of Chinese provincial foreign trade is calculated.
 - (i) To extract the global common factors of time series.
In this paper, the global common factor of time series is extracted by the rule that the feature root is greater than 1. As shown in Table 3, four common factors can be extracted, and the cumulative variance contribution is as high as 95%. The gravel map (Figure 1) also shows that selecting 4 common factors is a good fit.
 - (ii) Calculate the comprehensive index of high-quality development of foreign trade of Chinese provinces.
Firstly, determine the weight of each index; secondly, according to the variance contribution rate and formula of the four global common factors extracted, the comprehensive evaluation expression of high-quality development of China's provincial foreign trade can be obtained. Finally, the weight of 28 indicators can be obtained.
- (4) According to the comprehensive index of high-quality development evaluation of Chinese provincial foreign trade, cluster analysis is carried out.

4. The Results of the Measurement of the High-Quality Development Level of China's Provincial Foreign Trade

Based on the global factor analysis model of time series, the measure steps are completed, and the weights of related indexes are obtained, China's provincial foreign trade quality development index from 2013 to 2019 (shown in Table 4).

4.1. The Result of High-Quality Development Evaluation Index of Chinese Provincial Foreign Trade. Table 4 shows the results of the comprehensive index of the high-quality development of China's provincial foreign trade from 2013 to 2019. Through observation and analysis, the results can be summarized as follows.

To begin with, the high-quality development of China's foreign trade as a whole shows a rising trend in fluctuation when compared to the national average. China's foreign trade quality development index climbed from 38.56 in 2013 to

39.99 in 2015 and then dipped in 2016 before rising to a new high of 40.81 in 2019. This clearly shows that China's high-quality foreign trade development has yielded phased results, effectively promoting the reform of foreign trade power and efficiency. In terms of rate of increase, China's composite index of high-quality development of foreign trade has risen by 2.25 in seven years, especially since 2017, reaching a new high, indicating that it has effectively promoted structural adjustment of China's foreign trade and a change in trade growth pattern in the context of high-quality development.

Secondly, from the perspective of the comprehensive evaluation index of high-quality development of China's provincial foreign trade, there is an obvious upward trend of fluctuations. Against the background of the overall high-quality development of China's foreign trade, the foreign trade development of the vast majority of provinces keeps pace with the high-quality development of China's foreign trade, even faster than that of the country, but, at the same time, the high-quality development index of foreign trade of some provinces appears to regress. This just shows that the high-quality development of China's foreign trade is not plain sailing, the growth rate of foreign trade in some provinces is facing the shift period, the period of painful adjustment of foreign trade structure, and the period of digesting the national foreign trade stimulation policy. The high-quality development of China's foreign trade not only has to face the uncertainty of the external environment but also has to bear the huge pressure of the "three-phase superimposition" in the internal regions. Therefore, in order to successfully pass the road of high-quality development of foreign trade and finally realize the trade power, it requires the coordinated development among the provinces to maintain the stability of high-quality foreign trade and finally to ensure the long-term power of the provincial government's high-quality foreign trade development and construction.

Finally, the high-quality development index of China's provincial foreign trade reveals the characteristics of regional imbalance based on the three regional averages. According to the average of China's three regional high-quality foreign trade development indexes, high-quality foreign trade development in each region has increased to varying degrees between 2013 and 2019, but there is a significant gap between regions. During the reporting period, the average value of the comprehensive index of high-quality development of foreign trade in the eastern region was always higher than the national average, indicating that it was the "leader" of China's high-quality development of foreign trade, while the average value of the central region was essentially the same as the national average, indicating that China's foreign trade is a high-quality development of the "Runner"; the western region has been lower during this period. Furthermore, it is easy to see the "high-quality" provinces in China's real foreign trade, which are primarily concentrated in the east, and the "low-quality" provinces in the Midwestern Sectional Figure Skating Championships.

4.2. The Analysis of the Ranking and Changes. According to the comprehensive evaluation index of high-quality

TABLE 3: Total variance explained.

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	20.761	74.145	74.145	20.761	74.145	74.145
2	3.294	11.763	85.908	3.294	11.763	85.908
3	1.552	5.543	91.451	1.552	5.543	91.451
4	1.001	3.576	95.028	1.001	3.576	95.028
5	0.386	1.379	96.407			

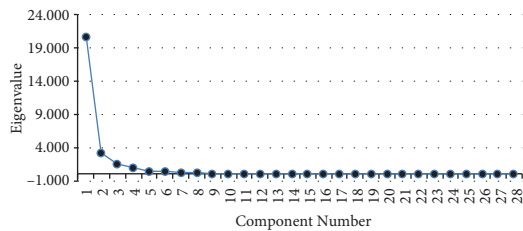


FIGURE 1: Scree plot.

development of China's provincial foreign trade from 2013 to 2019, the provincial ranking and changes are shown in Table 5.

Judging from the ranking of the comprehensive evaluation index of high-quality development of provincial foreign trade, in 2013, Beijing, Guangdong, Shanghai, Zhejiang, Jiangsu, Shandong, Anhui, Fujian, Tianjin, and Chongqing ranked in the top 10 on the comprehensive evaluation index for high-quality development of provincial foreign trade, with 8 of the top 10 in the eastern provinces, and the central and western provinces each had one; Hubei, Jiangxi, Guizhou, Shanxi, Liaoning, Jilin, Henan, Ningxia, Heilongjiang, and Gansu were ranked 11th to 20th, respectively, including one eastern province, six central provinces, and three western provinces; Hunan, Yunnan, Sichuan, Guangxi, Shaanxi, Hainan, Inner Mongolia, Qinghai, Hebei, and Xinjiang are ranked 21th–30th, and these ten provinces were three in the east, two in the centre, and five in the west. Based on this, it can be concluded that, in 2013, the provinces with the higher comprehensive evaluation index of high-quality development of foreign trade in China's provinces were mainly concentrated in the eastern region, while the middle-level provinces were concentrated in the central region, and half of the provinces in the west ranked relatively low. In 2019, Beijing, Guangdong, Shanghai, Zhejiang, Jiangsu, Fujian, Shandong, Chongqing, Anhui, and Guizhou were the top 10 ranked in China's foreign trade quality comprehensive evaluation index: seven eastern provinces, one central province, and two western provinces; Jiangxi, Tianjin, Hubei, Hunan, Jilin, Ningxia, Henan, Liaoning, Gansu, and Shaanxi were ranked 11th–20th, followed by Jiangxi, Tianjin, Hubei, Hunan, Jilin, Henan, Gansu, and Shaanxi: two eastern provinces, five central provinces, and three western provinces; Hebei, Heilongjiang, Yunnan, Shanxi, Inner Mongolia, Sichuan, Guangxi, Xinjiang, Hainan, and Qinghai were ranked 21st to 30th: three of the 10 provinces were in the east, three in the centre, and four in the west. Compared with 2013, in 2019, the provinces with

higher comprehensive evaluation indexes for high-quality development of foreign trade in China's provinces were still concentrated in the eastern region, while the provinces with lower comprehensive evaluation indexes were still concentrated in the central and western regions; the phenomenon of "east high, middle high and west low" still existed.

From 2013 to 2019, the rankings of 12 provinces rose, accounting for 40% of the total: two provinces in eastern Hebei and Fujian, four provinces in central Inner Mongolia, Jilin, Jiangxi, and Hunan, and six provinces in the west: Chongqing, Guizhou, Shaanxi, Gansu, Ningxia, and Xinjiang. Hebei, Hunan, and Shaanxi all saw higher increases, with Hebei up 8, Hunan up 7, and Shaanxi up 5. Six provinces remained unchanged in the rankings during the same time period: Beijing, Guangdong, Shanghai, Zhejiang, Jiangsu, and Henan. The other 12 provinces fell during the same time period, with five in the eastern provinces of Tianjin, Liaoning, Shandong, Guangxi, and Hainan; four in the central provinces of Shanxi, Heilongjiang, Anhui, and Hubei; and three in the western provinces of Sichuan, Yunnan, and Qinghai, respectively.

4.3. The Cluster Analysis of the High-Quality Development of China's Provincial Foreign Trade. According to the comprehensive index of the high-quality development of China's provincial foreign trade shown in Table 4, based on the cluster analysis, 30 provinces are divided into 4 categories.

The first category includes Beijing, Guangdong, and Shanghai. These three cities are the regions where the foreign trade is developing with the highest quality, and their comprehensive index of high-quality development of foreign trade has maintained the top three places in the ranking from 2013 to 2019. The overall development of high-quality development of foreign trade is on a steady upward trend; it will play an important leading role in the high-quality development of foreign trade in other regions of China. Beijing, Shanghai, and Guangdong are China's economically powerful cities with convenient transportation and high level of infrastructure construction. No matter capital or talents, these three cities will be considered or selected optimally. All aspects are conducive to the development of their foreign trade. Guangdong, as a big and powerful trade city of China, has unique geographical conditions, is the window of China's opening up, and is the barometer of China's foreign trade. For Beijing and Shanghai, two international metropolises, all aspects of development follow the pace of the world, so they also have strength and advantages in high-quality development of foreign trade,

TABLE 4: 2013–2019 China’s provincial foreign trade quality development index.

		2013	2014	2015	2016	2017	2018	2019
Eastern region	Beijing	55.48	56.29	58.31	58.39	57.43	60.26	60.41
	Shanghai	52.60	53.38	54.95	54.90	55.91	54.98	55.32
	Tianjin	40.78	41.24	41.55	39.9	39.39	38.51	40.96
	Hebei	29.37	34.24	35.08	31.32	34.29	35.22	36.11
	Liaoning	36.97	36.39	36.23	33.12	35.62	37.48	38.26
	Jiangsu	45.30	46.59	45.77	48.10	46.35	48.48	48.33
	Zhejiang	46.28	44.93	47.57	46.86	47.66	46.68	49.11
	Fujian	41.75	42.25	44.89	42.59	48.22	46.73	46.06
	Shandong	44.56	44.10	44.30	43.60	43.48	44.45	44.86
	Guangdong	55.56	56.64	56.68	57.64	58.63	59.25	61.06
	Hainan	32.72	30.22	35.41	29.71	29.04	30.03	31.9
	<i>Average</i>	43.76	44.21	45.52	44.19	45.09	45.64	46.58
Central region	Jilin	35.88	38.71	38.03	35.46	37.60	40.52	40.18
	Heilongjiang	36.74	34.54	38.77	33.23	32.88	36.96	35.83
	Anhui	41.96	43.34	44.07	43.95	42.45	43.57	42.58
	Jiangxi	37.91	37.11	39.24	37.9	38.95	42.77	41.95
	Henan	36.43	35.71	36.65	36.41	37.24	41.42	39.86
	Hubei	38.20	38.47	39.54	40.09	39.88	39.40	40.37
	Hunan	34.47	36.10	35.10	38.70	36.62	39.06	40.23
	Shanxi	37.36	36.24	35.55	34.51	32.04	36.33	34.04
	<i>Average</i>	37.37	37.53	38.37	37.53	37.21	40.00	39.38
Western region	Guangxi	33.20	30.71	32.27	30.18	31.11	31.86	32.39
	Chongqing	38.77	37.51	41.89	41.62	42.59	43.05	43.50
	Sichuan	37.45	32.20	36.91	30.95	31.65	32.97	32.70
	Guizhou	37.65	37.28	41.06	39.25	36.88	36.99	42.32
	Yunnan	34.46	34.65	35.70	34.21	35.58	36.72	34.85
	Shanxi	32.81	32.43	33.38	34.13	35.10	35.70	36.66
	Gansu	35.20	35.86	39.28	33.99	39.19	38.75	36.9
	Qinghai	30.40	37.71	31.51	27.81	36.13	32.61	31.47
	Ningxia	35.26	38.72	34.84	37.40	41.72	42.50	40.11
	Xijiang	29.12	34.35	32.45	30.81	32.19	33.22	32.11
	<i>Average</i>	34.04	35.40	35.64	33.57	36.06	36.18	35.89
	<i>Average of China</i>	38.56	39.11	39.99	38.54	39.58	40.75	40.81

becomeing the leader of high-quality development of China’s foreign trade.

The second category includes Jiangsu, Zhejiang, Anhui, Shandong, and Fujian. These provinces, except Anhui, are all eastern coastal provinces, all of which have good geographical conditions, strong base, and sufficient reserves of capital and talents, and have been playing an important role in the development of China’s foreign trade. In the context of China’s high-quality development, these provinces have followed in the footsteps of the country, promoted the position of foreign trade in the international value chain through transformation and upgrading, and strengthened their ties with other provinces within China; enhancing their own foreign trade development capacity at the same time also led to the development of foreign trade in other provinces. In terms of geographical location, these provinces are characterized by the encirclement of Jiangsu, Anhui, and Fujian, which encircles Zhejiang in the middle, and the border of Zhejiang, Jiangsu, and Anhui with Shanghai, an international metropolis, although Shandong is not in the first two areas, but with Jiangsu border. Therefore, it can be said that these five provinces are in a good environment, with their own strength, good geographical environment, resource environment, and foreign trade environment in the

high-quality development of China’s foreign trade, and must become the main force.

Tianjin, Jilin, Jiangxi, Henan, Hubei, Hunan, Chongqing, Guizhou, Gansu, and Qinghai are the ten provinces (or cities) in the third category. Five of the ten provinces are in the central region, four are in the western region, and only Tianjin is in the east. Foreign trade has grown rapidly in recent years in the five provinces of the central region. Jiangxi, Henan, Hubei, and Hunan provinces, in particular, have played a significant role in China’s “Rise of the Central Region” and are an important base and integrated transportation hub for the country; they have also taken on the important task of transferring manufacturing industry; the growth rate of foreign trade in the four western provinces is faster and stronger than that in the central region after 2013. However, whether in the central or western regions, these provinces’ foreign trade development is still based on the extensive development model. “Three high and one low” will become the biggest obstacle to the future development of the eastern region’s trade in the process of developing foreign trade or undertaking industrial transfer.

The fourth category includes the 12 provinces of Hebei, Shanxi, Inner Mongolia, Liaoning, Heilongjiang, Guangxi, Hainan, Sichuan, Yunnan, Shaanxi, Ningxia, and Xinjiang.

TABLE 5: Ranking and changes of China provincial foreign trade quality development index.

	2013	2014	2015	2016	2017	2018	2019
Beijing	1	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
Tianjin	9	9 (0)	10 (-1)	11 (1)	12 (-1)	17 (-5)	12 (5)
Hebei	29	25 (4)	24 (1)	24 (0)	23 (1)	25 (-2)	21 (4)
Shanxi	14	17 (-3)	22 (-5)	18 (4)	26 (-8)	22 (4)	24 (-2)
Neimenggu	27	21 (6)	27 (-6)	29 (-2)	27 (2)	23 (4)	25 (-2)
Liaoning	15	16 (-1)	19 (-3)	23 (-4)	20 (3)	18 (2)	18 (0)
Jilin	16	10 (6)	15 (-5)	16 (-1)	15 (1)	13 (2)	15 (-2)
Heilongjiang	19	23 (-4)	20 (3)	22 (-2)	24 (-2)	20 (4)	22 (-2)
Shanghai	3	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)
Jiangsu	5	4 (1)	5 (-1)	4 (1)	6 (-2)	4 (2)	5 (-1)
Zhejiang	4	5 (-1)	4 (1)	5 (-1)	5 (0)	6 (-1)	4 (2)
Anhui	7	7 (0)	8 (-1)	6 (2)	9 (-3)	8 (1)	9 (-1)
Fujian	8	8 (0)	6 (1)	8 (-6)	4 (4)	5 (-1)	6 (-1)
Jiangxi	12	15 (-3)	14 (0)	14 (0)	14 (0)	10 (4)	11 (-1)
Shandong	6	6 (0)	7 (-1)	7 (0)	7 (0)	7 (0)	7 (0)
Henan	17	20 (-3)	18 (2)	15 (3)	16 (-1)	12 (4)	17 (-5)
Hubei	11	11 (0)	12 (-1)	10 (2)	11 (-1)	14 (-3)	13 (1)
Hunan	21	18 (3)	23 (-5)	13 (10)	18 (-5)	15 (3)	14 (1)
Guangdong	2	2 (0)	2 (0)	2 (0)	2 (0)	2 (0)	2 (0)
Guangxi	24	29 (-5)	29 (0)	27 (2)	29 (-2)	29 (0)	27 (2)
Hainan	26	30 (-4)	25 (5)	28 (-3)	30 (-2)	30 (0)	29 (1)
Chongqing	10	12 (-2)	9 (0)	9 (0)	8 (1)	9 (-1)	8 (1)
Sichuan	23	27 (-4)	17 (10)	25 (-8)	28 (-3)	27 (1)	26 (1)
Guizhou	13	14 (-1)	11 (3)	12 (-2)	17 (-5)	19 (-2)	10 (9)
Yunnan	22	22 (0)	21 (1)	19 (2)	21 (-2)	21 (0)	23 (-2)
Shanxi	25	27 (-2)	26 (1)	20 (6)	22 (2)	24 (-2)	20 (4)
Gansu	20	19 (1)	13 (6)	21 (-8)	13 (8)	16 (-3)	19 (-3)
Qinghai	28	28 (0)	30 (-2)	30 (0)	19 (11)	28 (-9)	30 (-2)
Ningxia	18	13 (5)	16 (-3)	17 (-1)	10 (7)	11 (-1)	16 (-5)
Xinjiang	30	24 (6)	28 (-4)	26 (2)	25 (1)	26 (-1)	28 (-2)

From the point of view of the seven provinces in the western region, all of these provinces belong to the regions where the development level of foreign trade in China's provinces is relatively backward, and the foreign trade is developing at a slower pace and mainly exports resource-intensive and labor-intensive products; because of their geographical location, these provinces have a single foreign trade market structure. For example, Inner Mongolia, Yunnan, and Xinjiang provinces mainly trade with neighboring countries, while Sichuan, Shaanxi, and Ningxia mainly trade with the United States; as a result, the development of foreign trade is easily affected by the change of external environment; Liaoning in the eastern region and Heilongjiang in the central region are both old industrial bases in the northeast of China, and their geographical positions are similar, and the developments of foreign trade are similar. Taihang Mountains separate the eastern part of Hebei from the central part of Shanxi. Both provinces are rich in mineral resources. In the course of their development, they are affected by geographical location, resource endowment, and so forth, and the speed of foreign trade development is relatively slow.

5. Conclusions and Recommendations

Based on the connotation of high-quality development of foreign trade, this paper establishes an index system to measure the high-quality development level of foreign trade

of Chinese provinces; using panel data of 30 provinces in China from 2013 to 2019, this paper measures the level of high-quality development of foreign trade in China's provinces and analyzes the ranking and changing trend of its comprehensive development index; 30 provinces were classified according to their high-quality development of foreign trade. The results show that, from 2013 to 2019, the high-quality development of China's foreign trade showed an upward trend; the level of high-quality foreign trade development in the eastern, central, and western regions of China has been raised to different degrees, but each region plays a different role in the development of high-quality foreign trade in China: the eastern region is the "leader," the central region is the "accompanying runner," and the western region is the "following runner." Compared with 2003, in 2019, the truly "high-quality" areas of the high-quality development of China's provincial foreign trade are still concentrated in the eastern region, ranking higher in the comprehensive evaluation index, and "low-quality" areas are concentrated in the Midwestern Sectional Figure Skating Championships, ranking lower in the comprehensive evaluation index.

Based on the previous research, this paper attempts to make policy recommendations from the three following points.

To begin with, trade innovation leads to high-quality foreign trade development. By continuously increasing investment in trade innovation, China's high-quality

development of foreign trade can only improve the competitiveness of trade innovation output. We should adopt different policies, focus on innovation input, and aim to upgrade innovation output according to the situation of various provinces and different development priorities from the perspective of China's provincial trade innovation development.

Second, to promote high-quality foreign trade development by strengthening the coordinated development of regional foreign trade, the most important part of achieving a more balanced regional structure is optimizing China's provincial trade mode structure and main trade structure, and the optimization of China's provincial trade mode structure and main trade structure is the basic component to achieve this link. We can see from the cluster analysis that different types of provincial regions have different problems and shortcomings when it comes to trade coordination. As a result, each type of provincial region, in accordance with the overall direction of China's trade development and in combination with its own circumstances, can only develop China's trade in a harmonious manner by constantly adjusting and optimizing the trade structure.

Finally, high-level opening-up will help to accelerate the development of high-quality foreign trade. The concept of trade opening-up should be further developed in the new era. Various provinces should correctly understand the meaning of opening-up in the context of their own circumstances and use reasonable methods to promote the development of trade opening-up in order to improve the conditions for the development of China's foreign trade and to expand the external market space of foreign trade in a broader, deeper, and more reasonable direction.

Data Availability

The data used to support the findings of this study are included within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

- [1] D. Xiang and J. Song, "The connotation, path and strategy of China's foreign trade turning to high-quality development," *Macro-Quality Research*, vol. 6, no. 3, pp. 22–31, 2018.
- [2] J. Chen, *Advance Path and Policy Choice of High Quality Development of Trade*, Study Times, Taiyuan, China, 2019.
- [3] L. Gao, "Creating a new situation of foreign trade with high-quality development," in *Proceedings of the Shanxi Political Consultative Conference*, Shanghai, China, March 2019.
- [4] J. Ma, "High-quality development of foreign trade: connotation, path and countermeasures," *Modern economic exploration*, vol. 7, no. 7, pp. 74–91, 2020.
- [5] W. Qu, Y. Cui, and L. Ma, "Evaluation and countermeasures of high-quality development of China's foreign trade," *International Trade*, no. 12, pp. 4–11, 2019.
- [6] J. Tang and J. Xia, "Construction and implementation path of high quality development evaluation index system of China's service trade," *Journal of Beijing University of Technology*, vol. 5, no. 5, pp. 47–57, 2020.
- [7] Y. Wu and S. Zhang, "Evolution and evaluation of trade quality in China," *Exploration of economic problems*, vol. 5, no. 5, pp. 146–152, 2021.
- [8] J. Cao and Q. Lei, "Evaluation of high-quality development of China's foreign trade under the new development concept," *Statistics and decision-making*, vol. 15, no. 15, pp. 100–104, 2021.
- [9] D. Yang, "Promoting high-quality development of foreign trade by brand building," *China Business Review*, vol. 36, no. 36, pp. 77–79, 2018.
- [10] F. Chang, *Promoting High Quality Development of Trade and Building strong Foundations of trade*, Economic Information Daily, Beijing, China, 2019.
- [11] H. Li, *Promoting High-Quality Development of Trade and Building strong Foundation of trade*, Economic Reference, Nanjing, China, 2020.
- [12] M. Rong, *Actively Expanding Imports: A New Impetus for Foreign Trade Development*, China trade daily, 2018.
- [13] D. Xiang, "Proactive Import expansion: the promotion mechanism and realization path of high-quality development," *Macroeconomic Quality*, vol. 7, no. 1, pp. 60–71, 2019.
- [14] A. Zhao, "Promoting high-quality development with high level," *China's Foreign Trade*, vol. 3, no. 3, pp. 18–21, 2018.
- [15] B. Sheng, "Progress in stability"and China's foreign trade fundamentals," *Academic Frontier*, vol. 5, no. 5, pp. 28–33, 2019.
- [16] C. Pei and H. Liu, "high-quality development of China's Foreign Trade: reflections on Xi Jinping's important thesis on the great change in the past century," *Economic Research*, no. 5, pp. 4–20, 2020.
- [17] B. Xu and J. Lu, "Foreign direct investment, processing trade, and the sophistication of China's exports," *China Economic Review*, vol. 20, no. 3, pp. 425–439, 2009.
- [18] S. W. John, L. Catherine, and M. T. Otsuki, "Trade facilitation and economic development : A new approach to measuring the impact," *The World Bank Economic Review*, vol. 17, no. 3, pp. 367–389, 2003.
- [19] W. Shi, "Evaluation of trade facilitation process and its effect on economic growth in western China," *Reforma*, vol. 7, no. 7, pp. 127–136, 2018.
- [20] B. Yin, X. Wen, and Y. Liu, "Does trade facilitation affect the technical complexity of exports -- a test based on provincial panel samples 2002-2014," *Science and management of Science and technology*, vol. 37, no. 12, pp. 73–81, 2016.
- [21] G. Chen and S. Li, "Official exchanges, tenure and the fight against corruption," *The World Economy*, vol. 2, no. 2, pp. 120–142, 2012.
- [22] L. Yao and R. Yan, "Measurement of the level of intellectual property protection in China and regional differences," *International Trade Issues*, vol. 1, no. 1, pp. 114–120, 2009.